REMARKS/ARGUMENTS

Overview of the invention:

The problem of thermal pole tip protrusion, due to thermal mismatch between the alumina and pole material during the writing process, has been overcome by dividing the bottom shield into two (coplanar) pieces both of which sit on top of a non-magnetic heat sink whose thermal conductivity is specified to be at least 300 W/m.K. Heat generated by the coil during writing is transferred to this non-magnetic heat sink whence it gets transferred to the substrate.

Reconsideration is requested of the rejection of claims 1-4 under on 35 U.S.C. 103(as) as being unpatentable over Kouchiyama (US PAT. 6,101,071) in view of Kikuchi et al. (US PGPUB 2003/0048578):

Citing new grounds, examiner is now relying on Kouchiyama in view of Kikuchi et al. Examiner argues that Kouchiyama teaches a pair of shields, separated by a gap, with a layer of non-magnetic material between one of the shields and the substrate. Kikuchi is invoked as teaching a magnetic head having a heat sink whose thermal conductivity is greater than 300 W/m.K.

With regard to Kouchiyama, it is readily apparent that Kouchiyama's structure is quite different from the structure described in our specification. Furthermore, reliance on Kouchiyama immediately renders our claim 4 allowable. Said claim 4 reads as follows:

4. The method described in claim 1 wherein said gap separating said opposing shield parts is between about 4 and 10 microns wide.

Examiner has rejected claim 4 stating "...the thickness of the gap (as per claim 4) would also have been an obvious matter of design choice to make a desired reproducing head of Kouchiyama modified by Kikuchi et al.".

It is, however, well known to those skilled in the art that the separation between the upper and lower shields of a magnetic write head needs to be less than 0.1 microns and preferably less than 0.05 microns. Spacing these shields any further apart leads to unacceptably poor density of the recorded data. A write head with a shield separation of 4 microns or more is therefore undesirable and is not a design option.

We have, however, elected to add the limitation 'coplanar' to claim 1 rendering Kouchiyama irrelevant since Kouchiyama's shields are not coplanar, one shield being below the GMR stack while the other shield is above the GMR stack. Claim 1 now reads as follows:

1. A method to improve heat dissipation in a magnetic shield, comprising:

providing said shield in the form of a layer of ferromagnetic material on a substrate;

inserting a layer of non-magnetic material, having a thermal conductivity greater than about 300 W/m.K, between said shield and said substrate; and

splitting said shield into two <u>coplanar</u> opposing parts separated by a gap.

Antecedent basis for this amendment can be found in the specification in the fifth paragraph of DESCRIPTION OF THE PREFERRED EMBODIMENTS.

With regard to Kikuchi, in his fig. 4 (cited by examiner) Kikuchi teaches away from the present invention by claiming a heat sink located between the upper and lower poles, not between the shield and the substrate. Kikuchi teaches away from the present invention in several other respects. In his claim 2, the majority of the materials that he lists (for his heat sink) have thermal conductivities less than 300 W/m.K (Sn 66.6, Zn 116, Pt 71.6, Pd 71.8, and Cr 93.7). Kikuchi actually contradicts this (except for Zn) in his claim 3 by claiming there a thermal conductivity in a range of 100 to 400 W/m.K.

In both claims 2 and 3, Kikuchi's ranges, although overlapping with those of the present invention, teach away from the present invention because the latter could not be made to operate as intended if any of more than half the listed materials were chosen for the heat sink and/or if a thermal conductivity in the range of 100-299 W/m.K were selected.

Thus, for the reasons cited above, neither Kouchiyama nor Kikuchi nor their combination, teaches or suggests the present claimed invention. Applicant therefore respectfully requests that a timely Notice of Allowance be issued in this case.

Respectfully submitted,

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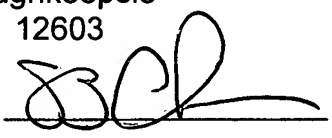
By 

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